

## CLAIMS

1) A hydraulic machine with radial cylinders of the type comprising pistons with radial stroke, arranged in contact with an outer cam and coplanar with said cylinders, each  
5 equipped with a roller on a path of said cam, characterised in that it has, in each piston, a rolling bearing, arranged with a inner ring coupled or coinciding with a pin for supporting said roller and an outer ring coupled or coinciding with the roller itself.

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2) A hydraulic machine according to the previous claim 1, characterised in that it has the roller and the corresponding rolling bearing with a small size such as to also allow, in the alternating motion of the piston,  
15 introduction steps of said roller in the liner of the cylinder.

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3) A hydraulic machine according to the previous claim 1, characterised in that it has said rolling bearing of a so-called full complement type.

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4) A hydraulic machine according to the previous claim 1, characterised in that it has said rolling bearing with rollers with an annular cage.

5) A hydraulic machine according to the previous claims 4, characterised in that it has said bearing with the annular cage in the middle of the bearing.

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6) A hydraulic machine according to the previous claim 1, characterised in that it has said bearing with the pin and the outer ring treated with setting heat treatments on steel of the type with minimised inclusions.

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7) A piston for a hydraulic machine with radial

cylinders with the pistons with radial stroke, as claimed in previous claim 1, arranged in contact with an outer cam and coplanar with said group of cylinders, equipped with a roller on the path of said cam, characterised in that it  
5 has said roller coupled in rotation with said piston with a rolling bearing.

8) A hydraulic machine with radial cylinders of the type comprising pistons with radial stroke, arranged in contact  
10 with an outer cam and coplanar with said cylinders, each equipped with a roller on a path of said cam, characterised in that it has, in each piston, an anti-friction ferrule placed in contact with a pin or with an inter-positioned and coupled support element for said roller; said ferrule  
15 being coupled with a inner diameter of the roller itself.

9) A hydraulic machine according to the previous claim 8, characterised in that it has said support element positioned between the pin and the anti-friction ferrule  
20 consisting of a spacer sleeve mounted with interference on said pin; an anti-friction surface of the ferrule is in sliding contact on an outer surface of said sleeve.

10) A hydraulic machine according to the previous  
25 claim 8, characterised in that it has said ferrule in planar iron material, wound inside said roller, on which there is a layer of anti-friction plastic material anchored in a stable way on it through a layer of sintered metal.

30 11) A hydraulic machine according to the previous claim 10, characterised in that it has the thickness of the support element in iron material of said bearing between 0.4 and 4% of the sliding diameter.

35 12) A hydraulic machine according to the previous

claim 8, characterised in that it has thrust blocks at the sides of said roller resting upon shoulders of the piston, equipped with, at least one face, a layer of anti-friction plastic material and a sintered anchoring layer thereof.

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13) A hydraulic machine according to the previous claim 10, characterised in that it has the thickness of said layer of anti-friction plastic material advantageously between 1 and 12 1/100 of a millimetre and the thickness of a sintered metal anchoring layer between 10 and 40 1/100 of a millimetre.

14) A piston for a hydraulic machine with radial cylinders with the pistons with radial stroke, as claimed in previous claim 8, arranged in contact with an outer cam and coplanar with said cylinders, equipped with a roller on the path of said cam, characterised in that it has said roller coupled in rotation with said piston with an anti-friction ferrule and relative support pin.

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15) A hydraulic machine with radial cylinders of the type comprising pistons with radial stroke, arranged in contact with an outer cam and coplanar with said cylinders, each equipped with a roller on a path of said cam, characterised in that it has both static and dynamic O-rings each consisting of a metal ring mounted with interference in the coupling on a sealing diameter and housed in a throat with slight axial clearance.

16) A hydraulic machine according to the previous claim 15, characterised in that it has a large depth of said throat with respect to its width and that of the ring.

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17) A hydraulic machine according to the previous claim 16, characterised in that it has the side shoulder of

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each O-ring with a width slightly greater than the depth of the throat.

18) A hydraulic machine according to the previous  
5 claim 15, characterised in that it has the roller supported by a pin with a rolling bearing, arranged with a inner ring coupled or coinciding with the pin for supporting said roller and the outer ring coupled or coinciding with the roller itself.

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19) A hydraulic machine according to the previous  
claim 15, characterised in that it has the roller supported  
by a pin with a sliding friction bearing with an anti-  
friction ferrule, placed in contact with the pin or with an  
15 inter-positioned and coupled support element for said roller; said ferrule being coupled with a inner diameter of the roller itself.